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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/680,901	10/06/2000	Paul W. Dent	1280.00271	2959
20792	7590	02/02/2004	EXAMINER	
MYERS BIGEL SIBLEY & SAJOVEC PO BOX 37428 RALEIGH, NC 27627			NGUYEN, DUNG X	
			ART UNIT	PAPER NUMBER
			2631	
DATE MAILED: 02/02/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.



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7590 01/16/2004

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EXAMINER

NGUYEN, DUNG X

ART UNIT	PAPER NUMBER
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2631

DATE MAILED: 01/16/2004

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# Office Action Summary

Application No.

09/680,901

Applicant(s)

DENT, PAUL W.

Examiner

Dung X Nguyen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1 - 19 and 23 - 51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17 - 18, 23 - 25, 36 - 41 is/are allowed.
- 6) ☒ Claim(s) 1 - 5, 9 - 12, 26 - 30, 34, 35, 42 - 46, and 48 - 51 is/are rejected.
- 7) ☒ Claim(s) 6 - 8, 13 - 16, 19, 31 - 33, and 47 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 & 7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

***DETAILED ACTION***

***Acknowledgement***

1. The Amendment filed on October 27, 2003 has been received and fully considered. Claims 20 – 22 have been canceled.

***Objections***

2. In page 1, line 3, and in page 3, line 7, the US Patent Application # 09/989,392 is not related to the inventor, Paul W. Dent. Is it 09/898,392. Appropriate correction is required.
3. In page 4, the Brief Description of Drawings on line 10+ does not describe claim # 4. Appropriate correction is required.
4. In claim 1, line 4, claim 14, lines 12 and 13, claim 19, line 3, claim 26, line 8, and column 30, line 2, the word of “of unquantized” has no meaning. Is it “of unquantized”? Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

*(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.*

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6. **Claims 1 – 3, 26 – 28, and 43 - 44 are rejected** under 35 U.S.C. 103(a) as being unpatentable over Arslan et al. in “New Methods for Adaptive Noise Suppression”, IEEE International Conference on Acoustics, speech, and Signal Processing 1995, 9 – 12 May 1995, vol. 1, pp. 812 - 815, and further in view of Fukasawa et al. (US patent # 5,533,012).

Regarding claim 1, Arslan et al. discloses the processing a group of currently received signal samples to determine a corresponding current set of un-quantized wanted data symbols and interfering waveform representative of a sum of other unwanted data symbols by subtracting an amount of a previously set of wanted symbols and a previously determined interference waveform (see “New Methods for Adaptive Noise Suppression”, IEEE International Conference on Acoustics, Speech, and Signal Processing 1995, vol. 1, Smoothed Spectral Subtraction section on page 812, column 2, line 10 to page 813, column 1, line 56).

Arslan et al. differs from the instant claimed invention that it does not state the step of quantizing the previous decoded set of wanted symbols and quantizing the determined current set of unquantized wanted symbols to obtain corresponding quantized symbols.

However, quantizing, encoding and decoding are on hand of one of ordinary skill in the art to transfer the wanted signal into digital signal and to protect the digital signal from interfering, and Fukasawa et al. discloses (figure 8) that adaptive quantizer 403 quantizes the determined current set of unquantized wanted symbols to obtain corresponding quantized symbols 404.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine Arslan et al. and Fukasawa et al to provide the step of quantizing the previous decoded set of wanted symbols and quantizing the determined current set of unquantized wanted symbols to obtain corresponding quantized symbols for improving the communication system.

Regarding claims 2 and 3, Fukasawa et al. further discloses (figure 8) that the adaptive predictor 407 determines a set of channel coefficients of a filter characterizing multipath propagation (column 14, lines 35 – 39 and abstract).

Regarding claim 26, the limitations are analyzed in the same manner set forth as claim 1.

Regarding claim 27, the limitations are analyzed in the same manner set forth as claim 2.

Regarding claim 28, the limitations are analyzed in the same manner set forth as claim 3.

Regarding claim 42, the limitations are analyzed in the same manner set forth as claim 1.

Regarding claim 43, the limitations are analyzed in the same manner set forth as claim 2.

Regarding claim 44, the limitations are analyzed in the same manner set forth as claim 3.

7. **Claims 4, 5, 9 – 12, 29, 30, 34, 35, 45, 46, and 48 - 51 are rejected** under 35 U.S.C. 103(a) as being unpatentable over Arslan et al. in “New Methods for Adaptive Noise Suppression”, IEEE International Conference on Acoustics, speech, and Signal Processing 1995, 9 – 12 May 1995, vol. 1, pp. 812 – 815, Fukasawa et al. (US patent # 5,533,012), and further in view of Craven et al. (US patent # 6,664,913 B1).

Regarding claim 4, Arslan et al. and Fukasawa et al. differ from the instant claimed invention that they do not show the step of wherein the filter comprising a time-reverse conjugate channel filter.

However, Craven et al. discloses the use of time-reverse conjugate filter (column 5, lines 41 – 46, column 16, lines 6 – 10, and column 48, lines 20 – 22), and also Arslan et al. discloses the uses of time-varying linear filter (“New Methods for Adaptive Noise Suppression”, page 813,

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column 2, lines 4 – 5), one can recognize the time-reverse conjugate channel filter being a special form of time-varying linear filter.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine Arslan et al., Fukasawa et al., and Craven et al. to provide the step of wherein the filter comprising a time-reverse conjugate channel filter for improving the waveform coding and decoding (column 1, lines 6 – 13 of Craven et al.).

Regarding claim 5, Arslan et al. and Fukasawa et al. differ from the instant claimed invention that they do not show the step of wherein the current set of unquantized wanted symbols includes only one wanted symbol.

However, the current set of unquantized wanted symbols may include only one wanted symbol or a plurality of wanted symbols being on the hand of one of ordinary skill in the art depending the designed choice.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to implement Arslan et al. and Fukasawa et al to provide the step of wherein the current set of unquantized wanted symbols includes only one wanted symbol for a designed choice.

Regarding claims 9 and 10, Fukasawa et al. further inherently discloses that the channel coefficients are determined by correlating the received signal samples with known ones of the data symbols known by both transmitter and receiver (column 1, line 9 to column 2, line 48, and column 7, lines 61 - 67).

Regarding claims 11 and 12, Arslan et al. and Fukasawa et al. differ from the instant claimed invention that they do not state the step of wherein the known symbols include previously decoded symbols and using a error correction decoder.

However, Arslan et al. discloses the known symbols include previously symbols and using a Fast Fourier Transform (see “New Methods for Adaptive Noise Suppression”, IEEE

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International Conference on Acoustics, Speech, and Signal Processing 1995, vol. 1, Smoothed Spectral Subtraction section on page 812, column 2, line 10 to page 813, column 1, line 56). The encoding and decoding just are the step of protecting the digital signal from noise and being on the hand of one of ordinary skill in the art.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine Arslan et al. and Fukasawa et al to provide the step of wherein the known symbols include previously decoded symbols and using a error correction decoder for improving the communication system.

Regarding claim 29, the limitations are analyzed in the same manner set forth as claim 4.

Regarding claims 34 and 35, the limitations are analyzed in the same manner set forth as the combination of claims 2, 10, and 11.

Regarding claim 45, the limitations are analyzed in the same manner set forth as claim 4.

Regarding claim 46, the limitations are analyzed in the same manner set forth as claim 5.

Regarding claims 48 and 49, the limitations are analyzed in the same manner set forth as the combination of claims 2, 10, and 11.

Regarding claims 50 and 51, Fukasawa et al. further discloses that its invention is used as a mobile terminal receiver or a base station receiver (column 1, lines 14 – 23).

***Allowable Subject Matter***

8. **Claim 14 would be allowable** if rewritten or amended to overcome the objection(s) set forth in this Office action.



9. **Claim 19 would be allowable** if rewritten to overcome the objection(s) set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

10. **Claims 6 – 8, 13, 15, 16, 31 – 33, and 47 are objected** to as being dependent upon a rejected or objected base claim, **but would be allowable** if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. **Claims 17 - 18, 23 – 25, and 36 - 41 are allowed.** The following is a statement of reasons for the indication of allowable subject matter:

Regarding to the claimed invention, the prior art of record fails to show or render obvious of a receiver for decoding quantized and un-quantized wanted data symbols from received signal samples comprising a control adapted to process a group of currently received signal samples and then to compute in a first and a second complex matrices based on multipath coefficients and a set of orthogonal set of orthogonal codes to determine a corresponding current set of un-quantized wanted data symbols and interfering waveform representative of sum of other unwanted data symbols by subtracting an amount of a previously decoded set of quantized wanted symbols and a previously determined interfering waveform. A quantizer quantizes the determined current set of un-quantized wanted data symbols to obtain current decoded and corresponding quantized symbols.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gao et al. (U.S. Patent No. 6,581,032 B1) discloses a bitstream protocol for transmission of encoded voice signals.

Ylitalo et al. (U.S. Patent No. 6,215,814 B1) discloses a Rake receiver.

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Agrawal et al. (U.S. Patent No. 6,134,215) discloses of using orthogonal waveforms to enable multiple transmitters to share a single CDM channel.

Kanzaki et al. (U.S. Patent No. 5,652,764) discloses a radio communication system generated by orthogonal code generators, subjected to binary phase modulation with a given carrier wave by BPSK modulators, and transmitted from separate antennas positioned in different spatial locations.

Falconer et al. (U.S. Patent No. 5,204,874) discloses a method and its corresponding apparatus for using orthogonal coding in a communication system.

***Contact Information***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung X. Nguyen whose telephone number is (703) 305-4892. The examiner can normally be reached on Monday through Friday from 8:30 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Ghayour Mohammad H. can be reached on (703) 306-3034. The fax phone numbers for this group is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3800.

DXN

January 05, 2004

  
**MOHAMMAD H. GHAYOUR**  
**PRIMARY EXAMINER**